CONTRIBUTION TO THE STUDY OF THE MYOSPASMS: MYOKYMIA, MYOCLONUS MULTIPLEX, MYOTONIA ACQUISITA, INTENTION SPASM.*

By G. L. Walton, M. D.,
of Boston.

There is much confusion in the classification of the various anomalies of the neuro-muscular mechanism which give rise to involuntary spasmodic movements. In a recent text-book the term myoclonia, for example, is made to include Friedreich's myoclonus multiplex, Bergeron's electric chorea, and the fibrillary chorea of Morvan, the description of the symptoms of myoclonia attempting to cover all three conditions. Again, a recent contribution describes, under the title hysterical myoclonia, a single case said to present tremor, astasia-abasia, simple chorea, fibrillary chorea and electric chorea. In other text-books myoclonia is made synonymous with myoclonus-multiplex, while still other authors do not use the word at all.

In calling attention to the persistent muscular quivering to which Schultze gave the name myokamia (from the Greekword meaning a wave), I do not propose to enter upon the general question of classification further than to clear the ground somewhat by assuming that we need not burden our minds with the effort to draw analogies between this disorder and the electric chorea of Dubini, to convulsive tic, or even to the fibrillary chorea of Morvan. Dubini's disease is infectious, endemic, and generally fatal; convulsive tic is generally unilateral, generally facial, and has little in common with the persistent fibrillary twitching under consideration, and the fibrillary chorea of Morvan is an acute disease of childhood accompanied by constitutional symptoms, in one case even by delirium, and in one case followed by death. It may appear somewhat radical, perhaps, to insist upon the absolute separation of myokymia from the myoclonus of Friedreich, to which disease its resemblance was thought by Kny to justify the name myoclonus fibrillaris multiplex, or from the electric chorea of Bergeron. But there is little to suggest clonic spasm in this general quivering of muscular fibers, certainly little to suggest the variety of contraction characteristic of Friedreich's myoclonus, although it is unfortunately true that the description of this disease includes occasional fibrillary twitching. The characteristic feature of the *myoclonus multiplex* consists in more or less symmetrical clonic spasm affecting the whole or greater part of the muscles involved, the muscles of the trunk and the large muscles of the extremities being most affected. Gowers[2], in discussing the various types included by different authors under the head of myoclonus multiplex, has expressed a justifiable doubt "whether any should be placed together that do not present the common features of the sudden shock-like character of the muscular contractions, their bilateral symmetry, and the comparative freedom of the extremities."

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Unless, therefore, further analogy is established between myokymia and myoclonus multiplex, it seems reasonable to regard myokymia as a separate disorder.

The persistent muscular quivering to which I would call attention (best named, perhaps, myokymia), a phenomenon most frequently observed in the adult male, though a troublesome disorder, is of no grave import, as far as can be judged from recorded cases. It may run a comparatively short course and terminate in recovery, or it may persist for years without appreciable effect upon the nutrition or the usefulness of the affected muscles. It does not involve the entire muscle at any given time, but affects group after group of fibers, most commonly in the muscles of the calf and thigh, especially the glutei, less often in the shoulder muscles, and still less often in the small muscles of the hand, and those of the trunk and face.

The electrical irritability is sometimes increased to both currents; tetanus may be produced by a moderate current, and persist after removal of the electrode.

The symptom may follow lead poisoning (Buber, Karcher), or poliomyelitis (Williamson), either directly, or after an interval, and in this event its spread is apt to be among the muscles not involved in the original paralysis. It is prone to appear during attacks of sciatica, and to persist long after the pain has passed away (Gowers, Hoffman, Bernhardt). Kny attributed it in one case to exposure and overwork, in the other to a blow in the groin. Its temporary appearance is not uncommon in health, and the fact that it may persist for a number of years without other sign of central or peripheral disease, past or present, is shown by the second of the personal cases I have to communicate.

The practical bearing of this study lies in the prognosis, which is apparently in marked contrast to that of the fibrillary twitching of progressive muscular atrophy, which it closely resembles.

Case I.—A professional man of thirty had an attack of poliomyelitis in infancy, which left the peroneal muscles and tibialis anticus permanently affected on the left side; there is a difference in measurement of about one inch in the thighs, but no local atrophy and no paralysis in this region. About six years ago he commenced to notice fibrillary twitching in the unaffected muscles of the paralyzed leg, especially in the calf muscles, which were first affected. The twitching gradually extended to the front of the thigh, and in the course of three years to the back of the thigh, particularly to the glutei. In the course of about two years the interosseus of the left index finger was attacked by fibrillary quivering. About three years ago the right calf muscles became affected, after which time quivering appeared occasionally in the muscles of the right thigh. During the past two years the intercostal and shoulder muscles have been included. There is no involvement of the face or neck.

The quivering affects for the most part only small bundles of fibers, spreading itself irregularly, sometimes passing from bundle to bundle, again, various bundles quivering at once. He is perfectly aware of the twitching through his sensation, but there is no pain. Occasionally the twitching will involve enough of the muscle to produce a movement, as of the finger or foot. The phenomenon appears while the limbs are in a state of relaxation, and is not increased by movement. It is practically constant.

There is no wasting, and the relative measurements of the legs remain the same. There is no weakness, no loss of voluntary motion, and no interference with the fine movements of the fingers as writing or handling an instrument; he is perhaps rather easily tired but no more so than can be explained by his work. There is no increased sweating, no palpitation, no disturbance of sleep, digestion, or other function, the heart and lungs are normal, also the urine. He is a man of high intellectual endowment, and of somewhat neuropathic tendency.

The knee-jerk on the right side is normal, and extremely difficult to elicit on the left when the patient is tired. This diminution of reflex of the left side is of long standing and probably represents a remnant of the poliomyelitis. There is no ankle-clonus. The posterior tibial artery and the dorsalis pedis pulsate normally on both sides. He is not subject to painful cramps. This is mentioned in view of the fibrillary twitching sometimes found in intermittent claudication.

This case seems to belong to the same class with that of Williamson (which also followed poliomyelitis after a considerable interval), in that the twitching is painless, and in that it follows a definite affection of the anterior horn cells. Certain of the cases occuring after lead poisoning should perhaps be included in the same category; in the case of Buber, for example, the fibrillary twitching was painless (except occasionally at the height of an unusually extensive spasm), and it was neither identical in time nor in distribution with the paralysis; the twitching lingered long after the paralysis had practically disappeared, and was most marked in the muscles unaffected by the original process. The case of Hoffman (following sciatica), should perhaps be included in the same class, in that the fibrillary twitching persisted during the intervals of the attacks of pain. The picture in Hoffman's case is somewhat complicated by the attacks of bilateral pain in the sciatic distribution, and the doubt as to the seat and nature of the pathological process causing them, but it is significant that the quivering persisted twenty years without definite muscular alteration, the patient dying of cancer of the stomach.

The case of Karcher, in which quivering accompanied lead poisoning, is similar in every respect to that of Buber, excepting with regard to the acuteness of the attack, and it may fairly, perhaps, be classed as a milder and less lasting form of the same affection.

The case of Biancone (classed by him as mild polyneuritis) seems very similar to that of Karcher, except that the nature of the poison or infection was not apparent. The case of Mayer may possibly be included in the same group, but in the presence of spastic paralysis and in the absence of history of either recovery or of long-standing atrophy or other disturbance, its classification is somewhat questionable.

In these cases there is nothing to suggest a reflex phenomenon, and the history points so definitely to the lower motor neurone as to throw the burden of the proof upon any other seat for the disturbance. The questions (a) what portion of the motor mechanism is disturbed, and (b) what is the nature of the disturbance, are not so easy to answer and will, perhaps, never be satisfactorily answered. The prevailing view regarding the unity of the neurone as a sufferer from toxic or infectious process relieves us of the duty of deciding whether the anterior nerve cell, or the nerve fiber, is the sufferer from such process, for both are doubtless affected, if either. It is less easy to decide whether the muscular mechanism is itself affected. The discussion of this point would involve considerations too speculative to detain us.

With regard to the *nature* of the disturbance we are again in doubt as to whether the process represents an increased irritability or a decreased innervation. We have not sufficient data to justify us in discussing this question at present, and we can do little more than classify and study these cases with a view to establishing at least a prognosis for our guidance. A single suggestion bearing on this question may not be out of place.

It seems to have been assumed by those discussing these cases that we have necessarily to do with an *irritative* phenomenon, whether of direct or of reflex stimulation, but is it not equally plausible that we have to do with something in the nature of a more or less rythmical lapse from tonicity; or again, that the quivering represents something analogous to increased mechanical irritability, or to certain stages of the degenerative reaction to galvanism, namely a phenomenon resulting from a quality inherent in muscle fiber and released to a greater or less degree when the muscle is freed from the controlling influence of the cerebro-spinal axis? Viewed in this light, the comparative innocuousness and even the disappearance of the quivering would not be surprising, for neither increased mechanical irritability, nor the first stages of the degenerative electrical reaction, are necessarily of grave import, though they *may* be followed by loss of function, just as fibrillary twitching may be, and generally is, followed by muscular atrophy and paralysis. It might be objected that the fibrillary quivering has no obvious stimulus for its production, and that it takes place while the muscles are at rest. We have no right, however, to assume from this that the quivering is spontaneous, for a mere change of position or of tension, a slight stretching or shortening of the muscle may well suffice to start the quivering in such anomalous musuclar tissues as those under consideration.

A discussion of this subject with my friend, Mr. John Stone Stone, the electrical expert, with a view to finding an analogy in that branch of science, gave rise to the suggestion on his part that we may have to do with a defective contact between the nerve ending and the muscle fiber, a condition known in electrical parlance as a "loose joint." This suggestion, like the theory of Duval, regarding the contact between the end brush and the nerve cell, will receive scant attention from those who find no fascination, and no reason, in the attempt to establish an analogy, if not an identity, between the electrical and the neural current, a search to be by no means hastily abandoned, however, either on account of general scepticism or even on account of apparently antagonistic findings.

The following case seems, at first thought at least, to fall into a somewhat different class from those previously considered.

Case II.—R. K., forty-eight years of age, single, a papermaker, has noticed for three years a tendency to quivering of various muscles. The onset was gradual, but the quivering soon became almost constant, and spread from the muscles of the legs and thighs to those of the forehead, the shoulder region and the lower face, all of which groups now show the characteristic fibrillary twitching with varying constancy, the gastrocnemii with absolute constancy. No pain accompanies the symptom, excepting that the patient is subject to frequent extremely painful cramps. The quivering tends to increase during movements, and shows marked increase after physical exertion. He tends to become, after walking, much more weary than he formerly did. He notices no other change in his general condition. There has been no wasting of muscles, no loss of power in any muscle or group of muscles, and no tenderness.

He has gained weight. He denies specific history; his family history as well as his previous personal history is uneventful. His parents died in advanced life, and neither had nervous or mental disease, or special neuropathic tendency. He is perhaps rather easily startled of late. He drinks two cups of coffee in the morning and drinks tea twice a day. He is subject to extremely painful cramps, generally in the thigh, occurring both by day and by night, and started by movement of the leg. The attacks last a few moments only, but may recur many times in the night. These attacks are of interest in connection with the fact that fibrillary twitching has been noted among the symptoms of claudication, or, as Dr. Paul and myself have ventured to name it, angina cruris.

Physical Examination.—There is continuous play of fibrillary twitching over the muscles of the calves, especially marked on the right; there is also quivering of bundles of fibers in the muscles of the forearm and of the shoulder group, in the chin and lip, in fact, in nearly every part of the body. The contraction has never been sufficiently extensive during my observation of the case to cause a definite movement as of a finger or toe, though he had one severe and painful cramp in the left thigh in my presence suggestive of the spasm of angina cruris. The patient is able to make all single movements, and combined movements, perfectly. The muscles of the extremities were carefully tested separately and all showed good strength. The grasps are strong, the patient can stand on his heels and toes with perfect facility, can stand with the feet together, and the eyes closed, without swaying, can ascend and descend stairs, or mount a chair with either foot with normal agility, strength and accuracy. There is no wasting of individual muscle or group of muscles; the right calf measures 14, the left 13¾ in. All forms of sensation are normal. The pupils are alike, well-rounded and of normal reaction to light and acommodation. The knee-jerks are normal and alike. The plantar reflex consists of slight flexion of all toes (normal) ; there is no Babinski and no clonus. The mechanical irritability in the calf muscles is increased, but tapping the muscle does not produce lasting tonic contraction.

Electrical reaction.—The application of the moderate faradic current to the muscles of the calf produces a slow tetanic contraction of the underlying bundle, persisting after removal of the electrode.* The vastus internus on the contrary, a muscle rarely the seat of twitching, reacts promptly to the faradic current with the brief and active contraction of the healthy muscle. The galvanic current presents less marked abnormality. The gastrocnemius, like the vastus internus, does not react to the direct application of this current until a strength of 10 m.a. is reached. This strength of current produces a reaction to the kathode closure slower, and more wavelike in the gastrocnemius. It was also noted that the anode closure, which caused in the vastus internus marked contraction, though less than that produced by the kathode closure, found no response in the gastrocnemius. The pulsation in all the arteries of the lower extremity is normal except in the dorsalis pedis on the right side, where it is only faintly perceptible.

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*This phenomenon suggests an analogy to myotonia acquisita, but the resemblance is not sufficient to justify its classification under this head.

In this case nothing points to affection of the anterior horn cells, either past or present. In the two cases of Kny this was also true, and he regarded the entire disturbance as functional, allied to the "Schreckneurose" of Friedreich. The rapid cure in his case lent weight to this supposition. But in our case the quivering has remained constant and unchanged for three years; other signs of neurasthenia are wanting, and it seems doubtful if we are justified in lightly turning the case off as functional, except indeed in the sense that it represents a disturbance of function of unknown pathology. It certainly seems hardly fair to class these cases under the neuroses. In the first place, fibrillary twitching, while more common in persons of neuropathic tendency, does not represent a disordered cerebral function, it is of comparatively rare occurrence in the hordes of hysterical and neurasthenic patients coming to the neurological clinics, but is of common occurrence in the well-known type of chronic anterior horn cell disease known as progressive muscular atrophy.

Is it not possible, then, that our case II and the two cases of Kny, represent a disordered function of the lower neurone allied to that established by the remains of poliomyelitis, or more acutely by the effects of lead upon this neurone but produced perhaps by faulty arterial equipment. The fact that during the progress of certain of these cases increased mechanical irritability and slight increase of direct muscular irritability to both forms of electrical current has appeared, tends to favor this hypothesis, and I do not see how we can avoid the suspicion, at least, that we have in the quivering of myokymia a symptom analogous to, though of less grave import than the fibrillary twitching of progressive muscular atrophy. When the pathogeny of the latter phenomenon is established, we probably shall not have far to look for that of the former.

To accentuate the fundamental difference in character and distribution of the spasms seen in paramyoclonus multiplex, I append the essential points of a fairly typical case of this disease recently seen in consultation with Dr. Dow, of Lawrence.

Case III.—Amarried lady, twenty-four years of age, has been subject to widespread clonic spasm for eight years. The movements began in the thighs and gradually involved the trunk muscles, particularly those of the abdominal and scapular regions. Later the occipito-frontalis became involved. The muscles of the neck have shared at times, causing backward movements of the head. The family history is negative as regards this and other form of nervous disease. As a girl she was rather delicate, but not hysterical. There has been no wasting of muscles, her general strength is good, and the movements interpose no physical bar to her usual duties and pleasures. Her general health, digestion, sleep and other functions are unimpaired.

Examination shows bilateral, almost symmetrical, clonic movements. The contractions of the quadriceps femoris, for example, are practically continuous, recurring with a frequency of about eighty per minute, varying somewhat in rhythm and in force, but always affecting the whole muscle. The movements can be plainly felt in the long tendon of the quadriceps femoris by the hand even outside the clothing. The abdomen presents almost constant alternating contraction and relaxation of muscles. The oblique muscles seem chiefly involved, and the movements produced are of a peculiar twisting character, not bending the body but moving the abdominal walls. The scapulae are drawn inwards and rotated upon themselves, the lower angles approaching each other while the upper angles are elevated. The result is a sort of shrugging movement of the shoulders. The occipito-frontalis is alternately contracted and relaxed, causing movement of the scalp. The movements of the occipito-frontalis, of the scapulae, and of the abdominal muscles are less rapid than those of the quadriceps femoris. *The muscles of the hands and arms as well as those of the legs below the knee* show *no sign of spasm. No trace of fibrillary twitching is visible during prolonged observation.* The mechanical irritability is not increased.

Examination is otherwise negative. The patient is rather delicately built, but is of good muscular development and exhibits no appearance of general nervousness. She is well poised, well controlled. The knee-jerk is normal, neither lively nor disagreeable. There is no anesthesia, no sensitive point, and no other hysterical stigma.

This variety of spasm offers no suggestion of muscular freedom from central control, but suggests rather imperfect action of the central mechanism itself. It would certainly seem that attempts to class the quivering of myokymia with movements of this character and distribution will hinder, rather than advance, our study of these neurological anomalies.

The contrast between myokymia and paramyoclonus is shown, again, in a case of the latter disease recently seen in consultation with Dr. Minot.

Case IV.—A young lady of rather slender build, with tubercular process of the apieces, for several months has been subject to twitching of certain muscles, increased by excitement. Inspection shows the more or less rhythmical clonic movements to be bilateral and symmetrical, and to affect only muscles attached to the trunk. The movements are most marked in the sterno-cleido-mastoids, both of which contract together producing a slight forward movement of the head without rotation or lateral inclination. The movements are painless. Each spasmodic contraction is followed by complete relaxation; no tendency to tonic spasm appears, and no tendency to prolongation of the malposition. The patient reports a previous attack of similar nature lasting several months, in which attack the abdominal muscles were affected, and apparently the diaphragm, judging from her description of a rhythmical noise resembling hiccough. No stigmata of hysteria were found and no history of hysterical tendency elicited.

Such a case may be readily mistaken for a bilateral form of the ordinary spasmodic torticollis, and in estimating the chances of recovery without operation from that affection, cases of this natûre should be excluded, for whatever the pathogeny of paramyoclonus it certainly differs fundamentally from spasmodic torticollis in clinical history, course and prognosis. I myself have reported under torticollis a case of so-called retrocollis with comparatively rapid recovery under massage and general measures, and I am free to acknowledge that paramyoclonus was not even considered in the diagnosis.

II. Myotonia Acquisita; Intention Spasm.

With the peculiar congenial anomaly known as Thomsen's disease we are familiar, though it may not have fallen to our lot to personally observe many cases.

The characteristic picture of this disorder consists in a congenital tendency for the muscles to fall into a state of tonic contraction upon voluntary effort. The tendency gradually wears away when the effort is continued, so that the patient walks, for example, as well as a healthy individual after he has awkwardly dragged himself a short distance. The characteristic electrical reaction consists in persistent tetanus on faradic or galvanic stimulation, in the equality of kathode with anode closure, in irregular waves of contraction on application of the faradic, and rhythmical waves of contraction on application of the galvanic current. Mechanical irritability is increased, and the stroke of the hammer produces tetanus. A few cases have been reported in which a disorder similar as regards voluntary movement, and identical as regards electrical reaction has first appeared in adult life without hereditary predisposition, and an intermediate condition is recorded (Martius and Hansemann) in which the disturbance was congenital, but of intermittent appearance.

Here, again, obviously distinct cases have been classed together. Talma, for example, who first used the term myotonia acquisita, in an article proving that the myotonic reaction was not pathognomonic of Thomsen's disease, grouped together five cases, in only two of which the peculiar tonic tendency occurred independently of infectious nervous or of intestinal disorder.

In the second of Talma's cases, the muscular disorder followed influenza, was accompanied by pain, by tenderness of spine and of nerve trunks, and was temporary. In his fourth and fifth cases the tonic spasm, though increased by movement, was continuous, was ushered in by acute and violent intestinal disturbance with hepatitis, and disappeared upon the subsidence of these conditions. These two cases, therefore, bear more resemblance to tetany than to either myotonia or intention spasm.

The case of Fürstner, ushered in and accompanied by mental depression, persistent whistling respiration, vaso-motor disorders, *continued rigidity* independent of voluntary movement, showed no mechanical or electrical change, and was benefited by suggestive therapeutics. Fürstner had obviously, then, to do with a psychopathic, not a myopathic disturbance, and if the name myotonia acquisita were allowed to cover both his case and all of Talma's five cases, its application would be indeed a broad one.

Jacoby in a critical review of this subject calls attention to two essentials of myotonia, whether congenital or acquired, namely, the myotonic motor disorder, and the myotonic reaction. He reports two cases which conform to these requirements. For the simple tendency of tonic spasm accompanying or following movement, he chooses the term *intention spasm* (Seeligmüller), and reports one such case. This classification seems reasonable, but is perhaps a little too sweeping, inasmuch as it would exclude from the myotonias such cases as that of Martius and Hansemann, in which the myotonic electrical reactions were present, but the motor disorder was not that characteristic of Thomsen's disease, for the spasm did not lessen on continued effort. The following case is offered as a remarkably persistent example of *intention spasm,* accompanying diabetes mellitus.

Case V.—F. A., a patient of Dr. Phippen, of Salem, was sent by him to the Massachusetts General Hospital for consultation, and was seen in the Neurological Department, Aug. 22, 1901. He is forty-nine years of age, single, American, a confectioner. Five years ago he noticed that on walking the muscles of the leg and thigh became rigid. No fright, exposure, overwork or other exciting cause was recognized. No cramp was noticed except while walking. There was no intestinal disorder. At times he would have a feeling that if he brought his foot down squarely he would be thrown in the air, and he avoided making this movement. There has been no pain connected with the spasm though he has had occasionally a dull pain in the lumbar region. Cold does not precipitate the difficulty. The tendency to stiffness on walking gradually increased during a year, since which time it has remained stationary.

The family history, as well as the previous personal history, is negative. His father died at 67 of some throat trouble, his mother at 37 from acute pulmonary disease. During the summer he lost twenty pounds in weight. There has been no disturbance of general health, no digestive disorder, headache, pain, tenderness or disturbance of special senses. He is not subject to cramps. There has been no shortness of breath, no swelling of feet, nor disorder of bladder or rectum. There has been no mental or physical irritability or morbid tendency, aside from the affection of gait. On one occasion he was able to run a short distance without trouble. Otherwise the condition has been unchanged.

Physical Examination.—The patient walks stiffly with a somewhat waddling gait, moderately spastic, not ataxic. The muscles of the thigh and calf, normal and soft while he occupies a sitting posture, are thrown at once into a condition of tonic contraction on the attempt to rise, and this contraction persists so long as he continues standing or walking. The tendency does not lessen on his persisting in the endeavor to walk, but remains constant throughout. He ascends better than descends stairs. He walks backward rather less stiffly than forward.

The knee-jerk is normal, rather active, alike on the two sides and not wearying on continued tapping. There is no loss of any form of sensation. The muscle and temperature senses were tested with special care, and found intact. The plantar reflex is normal (flexion) ; there is no Babinski. There is no clonus. There is no atrophy, no loss of motion in any muscle or group of muscles, other than the impediment interposed by the contraction. He can stand on toes and heels, and in sitting can raise toes naturally with heels on the ground. He can stand on either leg without swaying. There is no incoördination of movement in arms or legs. He has great difficulty in stooping. The muscles are of good size, but nothing in their appearance suggests hypertrophy. The left thigh measures 14½ inches, the right 14⅜ inches, in the smallest part. The muscles of the thigh are well rounded and of normal appearance, those of the calf are well developed, but not distinctly hypertrophied; the calves measure each 14¼ inches. There is no increased mechanical irritability of any muscles of the leg, and no change in electrical reaction, unless, perhaps, the reaction to the faradic current is rather slow in the gastrocnemius, not sufficiently so, however, to suggest tonus.

The urine, which was found normal at the last examination (1 year ago), at this examination contains sugar. The specific gravity is 1024, the reaction acid, there is no albumin. Further examination of the urine has shown that the presence of sugar is constant, though without constitutional signs of diabetes.

The symptoms in this case differ from those of myotonia* in that the tendency to tonic contraction does not wear away upon continued use of the parts, and in the absence of the myotonic electrical reaction. Inflammatory and degenerative disease of the nervous system, peripheral or central, is eliminated by the absence, during five years, of constitutional symptoms, the absence of disordered reflexes, nutrition, sensation, vaso-motor or secretory mechanism, as well as lack of tenderness, of pain, of pupillary change, and of motor disorder, other than the impediment offered by the tonic contraction. We have obviously to do with a non-inflammatory, non-degenerative and non-infectious muscular affection without known organic basis. Nor are we justified in classing the case as hysteria or neurasthenia, excepting as we may choose these designations to cover all nervous disorders without recognizable organic basis, in which case we are no nearer to understanding the phenomenon than if we had not named it at all. No attempt has been made to solve these cases, and no basis has been suggested, beyond that of increased irritability, which really means nothing. Here again the study offers at present little satisfaction beyond the establishment of the prognosis, which is apparently good, as regards life and general health, unless other disorder is present. It is too soon to establish a prognosis as regards the disappearance of the symptoms. Jacoby's case apparently recovered in less than a year. It is to be hoped that all similar cases will be reported, that we may have reliable data upon the question of the course and ultimate result of the malady.

To revert to the analogy between the neural and the electric force, it may not be without the realm of plausibility to suggest that if such analogy is ever established it may appear that the symptom under consideration is due to something akin to the residuary magnetism of which we have a practical

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*Myotonia appears to have been used also in the collective sense. Hochsinger describes as myotonia of infancy the persistent hypertonicity of the flexors, and diagnosticates it from tetany, but if myotonia is used as an inclusive term it is a question if it should not cover tetany itself, while if it is used in the narrow sense it has been preëmpted by Thomsen's disease. Such considerations render it advisable to avoid using myotonia as well as myoclonia as generic terms, substituting, perhaps, the word *myospasm,* clonic and tonic (a suggestion for which I am indebted to Dr. Courtney).

demonstration in the occasional tendency for the vibrator of the faradic apparatus to remain glued to the electro-magnet.

In conclusion, it seems pertinent to make the following suggestions:

(1) The term *myoclonia,* as a collective designation for the unrelated disorders, should be discontinued.

(2) The term *myokymia* should be limited to cases showing, without hereditary or congenital history, widespread muscular quivering, without atrophy or other indication of progressive degeneration of the nervous system, without constitutional symptoms, and without sign of present infectious or other acute disease. Cases should not be excluded, however, on account of preceding or introductory symptoms pointing to disease of the lower neurones, if such disease has either disappeared or come to a standstill.

(3) The term *myoclonus fibrillaris multiplex* should not be applied to such cases, since it suggests a relationship between myokymia and the paramyoclonus multiplex of Friedreich, with which it has nothing in common.

(4) *Myoclonus multiplex* (the prefix para seems superfluous), should be used to designate bilateral clonic spasms involving whole muscles or groups of muscles, generally those attached partly or entirely to the trunk.

(5) The term *myotonia acquisita* should be limited to non-hereditary and non-congenital cases in which otherwise healthy individuals present the typical motor disorder or the typical reactions of Thomsen's disease. This term should not include the rigidity accompanying marked intestinal disorder or pronounced psychopathic states, even though the rigidity in the latter conditions may be increased by voluntary movement.

(6) The tendency to spasm on attempted voluntary movement, unless accompanied by the typical motor disorder, or the typical reactions of Thomsen's disease, should be classed as *intention spasm.*

(7) The term *myospasm,* clonic or tonic, may be used instead of myoclonia and myotonia, when it is desirable to include under one head the various forms of involuntary muscular contraction without known organic basis.

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